
**Železniške naprave - Načrtovanje za osebe z omejenimi gibalnimi sposobnostmi -
Splošne zahteve - 1. del: Kontrast**

Railway applications - Design for PRM use - General requirements - Part 1: Contrast

Bahnanwendungen - Gestaltung für die Nutzung durch PRM - Allgemeine
Anforderungen - Teil 1: Kontrast

Applications ferroviaires - Conception destinée à l'usage par les PMR - Exigences
générales - Partie 1: Contraste

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**Railway applications - Design for PRM use - General
requirements - Part 1: Contrast**

Applications ferroviaires - Conception destinée à
l'usage par les PMR - Exigences générales - Partie 1:
Contraste

Bahnanwendungen - Gestaltung für die Nutzung durch
PRM - Allgemeine Anforderungen - Teil 1: Kontrast

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 256.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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prEN 16584-1:2022 (E)**European foreword**

This document (prEN 16584-1:2022) has been prepared by Technical Committee CEN/TC 256 “Railway applications”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 16584-1:2017.

In comparison with the previous edition, the following technical modifications have been made:

- The document template has been updated
- The document has been revised generally for document references and editorial issues with grammar
- Scope modified
- Normative references updated
- Terms and definitions revised
- 5.1 removed references to annexes covering EC verification and testing requirements
- 5.2.6 Platform danger area and edge of platform - Note 2 moved from 7) to 5)
- 5.2.7 End of Platform – addition of ‘contrast requirement for the barrier shall be assessed according to ‘Free standing Device’
- 5.3.2.1 Doors General – addition of ‘Where the control is a manual device see Figure 1’
- 5.3.4 Interior doors - text modified
- 5.3.6.2 - text amended and additional Figures added
- 5.4 Boarding aids - text changed from ‘up-stand’ to ‘tapered lip’
- Annex A “EC verification - Interoperability constituents” removed
- Annex B “Summary of testing requirements” removed
- Subsequent Annexes renumbered
- Annex ZA updated.
- Bibliography updated

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

Introduction

This document is part of a suite of four ‘Design for PRM use’ standards that have in total nine parts:

- EN 16584 is a standard that covers both infrastructure and rolling stock — Railway applications — Design for PRM use — General requirements:
 - Part 1: Contrast (EN 16584-1)
 - Part 2: Information (EN 16584-2)
 - Part 3: Optical and friction characteristics (EN 16584-3)
- EN 16585 is a standard that covers rolling stock — Railway applications — Design for PRM use — Equipment and components onboard rolling stock:
 - Part 1: Toilets (EN 16585-1)
 - Part 2: Elements for sitting, standing and moving (EN 16585-2)
 - Part 3: Clearways and internal doors (EN 16585-3)
- EN 16586 is a standard that covers rolling stock — Railway applications — Design for PRM use — Accessibility of persons with reduced mobility to rolling stock:
 - Part 1: Steps for access and egress (EN 16586-1)
 - Part 2: Boarding aids (EN 16586-2)
- EN 16587 is a standard that covers infrastructure — Railway applications — Design for PRM use — Requirements for obstacle-free routes for infrastructure.

These standards aim to clarify the requirements (with clear and consistent terms and definitions) and to define the associated criteria and, where appropriate, methodologies to allow a clear pass/fail assessment.

1 Scope

This document describes the specific 'Design for PRM use' requirements applying to both infrastructure and rolling stock and the assessment of those requirements. The following applies to this document:

- The definitions and requirements describe specific aspects of 'Design for PRM use' required by persons with disabilities and persons with reduced mobility as defined in the PRM TSI.
- This document defines elements that are universally valid for board-free travelling including lighting, contrast, tactile feedback, transmission of visual and acoustic information. The definitions and requirements of this document cover the infrastructure and rolling stock applications.
- This document only refers to aspects of accessibility for PRM passengers; it does not define non-PRM related requirements and definitions.
- This document assumes that the infrastructure or rolling stock is in its defined operating condition.
- Where minimum or maximum dimensions are quoted these are absolute NOT nominal requirements.
- This document is not specifically intended for Urban Rail, however these standards or clauses from these standards can be adopted by Urban Rail projects should they choose to do so.

The 'General requirements' standard is written in three parts:

- This document is Part 1 and contains

- Contrast

- Part 2 contains

- Spoken information

- Written information

- Tactile information

- Pictograms

- Audible signals

- Part 3 contains

- Lighting

- Low reflective properties

- Transparent obstacles

- Slip resistance

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10088-2, *Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 13272-1, *Railway applications - Electrical lighting for rolling stock in public transport systems - Part 1: Heavy rail*

prEN 16584-2:2022, *Railway applications — Design for PRM use — General requirements — Part 2: Information*

prEN 16584-3:2022, *Railway applications — Design for PRM use — General requirements — Part 3: Optical and friction characteristics*

prEN 16586-1:2022, *Railway applications — Design for PRM use — Accessibility of persons with reduced mobility to rolling stock — Part 1: Steps for access and egress*

prEN 16587:2022, *Railway applications — Design for PRM use — Requirements for obstacle-free routes for infrastructure*

ISO 17398, *Safety colours and safety signs — Classification, performance and durability of safety signs*

ISO 21542, *Building construction — Accessibility and usability of the built environment*

ISO 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

bezel

raised area that surrounds a pressel as part of a pushbutton

3.2

boarding aid

device (fixed or portable) that bridges the gap between rolling stock and platform to allow a PRM to board or alight from a train

Note 1 to entry: These include manual, semi-automatic or automatic ramps, lifts and other devices.

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3.3

bridging plate

retractable device integrated into the vehicle as close as possible to the door threshold level that enables access for wheelchair users, fully automatic and activated/controlled in conjunction with the door opening/closing sequences or semi-automatic on demand from passenger or staff

Note 1 to entry: It retains its strength without support on the station platform when extended.

3.4

character height

vertical size of uppercase letters or numbers

3.5

clear width**clear usable width**

unobstructed width of an open door or clearway to allow all passengers, including PRM, to pass through

3.6

contrast

perception of a difference visually between one surface or element of a building/rail vehicle and another by reference to their light reflectance values (LRV) or luminance values

Note 1 to entry: See BS 8300-1 and BS 8300-2 for further information

3.7

customer information

visual and spoken information other than information intended only for staff

3.8

doorway

opening in the vehicle body side that allows access to and egress from that vehicle

3.9

effective clear width

horizontal usable width of the surface of a boarding aid or entrance step

3.10

first step

step that is the first step for a passenger to use, to overcome a height change

Note 1 to entry: For the external access/egress steps this will normally be the step that is closest to the platform edge (fixed or movable step), therefore this is the first step when boarding and the last step when alighting.

Note 2 to entry: In the context of steps for internal height changes (other than the external access/egress steps) this means the first usable step when ascending and the edge of the walking floor when descending.

3.11

fixed longitudinal seat

passenger seat which is installed along the body side (not foldable or intended to tip up) facing perpendicular to the direction of travel

3.12**free standing device**

element or item within the confines of the station and on platforms, whether fixed or removable, that is not part of the station structures

Note 1 to entry: Elements that are not included in this definition are lifts, external staircases, walls, any suspended devices, (the lower most part of which is more than 2 100 mm above the walking floor) and items that have a dimension greater (perpendicular to the walking direction) than 2 000 mm (e.g. fence, waiting shelter)

3.13**gap**

distance between a platform and the closest point on the rolling stock at the passenger door where passengers traverse from one to the other (both vertical and horizontal)

3.14**halo**

illuminated ring surrounding a pressel, not necessarily continuous

3.15**handhold**

discontinuous element designed to be gripped or held in order to aid personal stability

3.16**handrail**

continuous element with round cross section for passengers to use to aid personal stability by gripping around

3.17**hue and chroma**

attributes of a colour which include its hue (frequency) and saturation (the dominant wavelength of a colour) also known as "chromaticity"

Note 1 to entry: A colour system (colour space, colour model) defines colour by hue, saturation and brightness. The hue is the predominant colour, the saturation is the colour intensity from achromatic (colourless) to the pure colour and the value (result) is the brightness from light to dark.

3.18**innovative solution**

technological progression that results in a solution that does not comply with the specification set out in Clause 5 of this standard or for which there are no assessment methods

Note 1 to entry: An innovative solution (Article 6 Commission Regulation (EU) No 1300/2014 or No xxxx/2022) may only be used following a positive opinion from the European Commission.

3.19**last step**

final step for an ascending passenger to use to overcome a height change, forming the edge of the walking floor

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prEN 16584-1:2022 (E)**3.20****LRV**

total quantity of visible light that is reflected by a surface at all wavelengths and directions when illuminated by a light source

Note 1 to entry: The measured range of LRV is between 0 and 100 points.

Note 2 to entry: See Annex D for further information.

3.21**obstacle-free route**

link between two or more public areas dedicated to the transport of passengers that can be navigated independently by all persons with disabilities and reduced mobility

Note 1 to entry: In order to achieve this, the route can be divided to better meet the needs of all persons with disabilities and reduced mobility. The combination of all the parts of the obstacle-free route constitutes the route accessible for all persons with disabilities and reduced mobility.

3.22**pictogram**

graphical symbol, diagram or Figure with a particular meaning which directly represents or conveys its meaning independently of language through a pictorial representation of a physical object, action or character

Note 1 to entry: Refer to ISO 7001, ISO/TR 7239 and ISO 9186 (all parts) for rules regarding graphical symbols and frames.

3.23**pressel**

surface of the pushbutton which is pressed in order to activate the pushbutton

3.24**routeing information**

information, used by passengers to guide them on their journey, a guide as to which route to take to get to a required destination or facility and changes along that journey

Note 1 to entry: This can be temporary information to an event e.g. exhibition or sporting event but NOT any form of commercial advertising.

3.25**spoken information**

information audibly communicated in words

Note 1 to entry: This can be direct, pre-recorded or synthesized information

3.26**standard toilet**

toilet not designed to be accessible to a passenger in a wheelchair

3.27**station**

any form of infrastructure where a train operates and passengers can board or alight in normal operation

3.28**step nose (nosing)**

intersection point of the projections of horizontal and vertical surfaces of a step

Note 1 to entry: This is illustrated in prEN 16586-1:2022 Annex B showing example step noses.

3.29**tactile**

information that is relayed through the physical sense of touch

Note 1 to entry: Tactile signs, controls, symbols, pictograms, guide path and Braille or raised characters are a physical means by which tactile information is provided

3.30**transparent obstacle**

obstacle that allows objects or images to be seen as if there were no intervening material, seen through with a level of clarity

Note 1 to entry: Transparency in this standard is when an obstacle allows at least 50 % direct light transmission

3.31**universal toilet**

toilet designed to be used by all passengers including passengers in wheelchairs

3.32**visual acuity**

the threshold of the capacity of the eye to perceive fine details of a visual object (a sign), the recognizability of which depends on the visual angle

3.33

visual information written information, pictograms and markings

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3.34**wheelchair space**

designated space in the passenger compartment for the wheelchair users and their wheelchairs

Note 1 to entry: Space can be designed for two wheelchairs, one beside the other (dual).

3.35**written information**

information visually communicated in words, letters and numerals, excluding pictograms and markings

4 Symbols and abbreviations

Table 1 — Abbreviations

Abbreviation	Designation
CIE	Commission Internationale de l'Eclairage.
EN	European Standard
ISO	the International Organization for Standardization
LRV	Light Reflectance Value
NCS	Natural Colour System
PRM	Persons with disabilities and persons with reduced mobility
TSI	Technical Specification for Interoperability
UV	Ultraviolet light

Table 2 — Symbols

Symbol	Designation	Unit
E_F	brightness of extraneous light	
k	unit of contrast	
K	correlated colour temperature (of a light source)	Kelvin
K_{eff}	the effective contrast	
L	unit of luminance in candela per square metre	cd/m ²
L_o	the LRV of the object	
L_1	the luminous densities for self-lit displays when off	
L_2	the luminous densities for self-lit displays when on	
L_c	the LRV of the character (signage only)	
L_F	the luminance generated by extraneous light	
L_h	the LRV of the background or adjacent surface	
lx	illuminance	lux
m	length	metre
mm	length	millimetre
nm	length (one billionth of a metre)	nanometre
ρ_A	reflectance value of surface of the display	

5 Requirements and assessment

5.1 General

The fonts, symbols and pictograms used for visual information shall contrast with their background.

- Contrast shall be assessed according to Annex A.

All dimensions in the Figures are in millimetres (mm) unless otherwise stated.

5.2 Infrastructure

5.2.1 Obstacle-free routes

5.2.1.1 Horizontal circulation

Where thresholds are installed on a horizontal route, they shall contrast with the surrounding floor and shall not be higher than 25 mm.

- Contrast shall be assessed according to Annex A.
- Assessment of height shall be according to prEN 16587:2022.

5.2.1.2 Vertical circulation

As a minimum the first and last steps of a flight of stairs shall be indicated by a contrasting band. This shall apply from a single step.

- Contrast shall be assessed according to Annex A.

5.2.2 Doors and entrances

This clause applies to all doors and entrances that are on obstacle-free routes according to prEN 16587:2022 with the exception of doors giving access to the toilets which are not dedicated to persons with disabilities and persons with reduced mobility.

If pushbuttons or other control devices are provided for operation of doors, then each pushbutton or device shall contrast with its surroundings:

- Contrast shall be assessed according to Annex A
- The surroundings shall be defined as 100 mm in at least two directions (at least 90 degrees apart) from the edge of the control bezel outwards over at least the full width of that control (the resultant area shall be at least 20 000 mm²) see Figures 1a and 1b
- The control for the doors if it is a pushbutton shall be assessed as the pressel, the illuminating halo and the bezel combined which shall have a minimum area of 5 000 mm². See Figure 2.